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REMARKS

Claims 1-5, 9-12, 15-18, and 21-35 remain pending in the present application. Claims 6-8, 13-14, and 19-20 have been cancelled. Claims 31 and 32 have had their dependency changed. No new matter has been added.

Election Requirement

Applicants previously orally elected the claims of Group II, with traverse, for examination. Applicants affirm that election of claims II. Pursuant to 37 CFR §1.142(b), claims 6-7, 13-14, and 19-20 (Group I) have been withdrawn from further consideration by the Examiner as being drawn to a non-elected invention. By the present amendment, these claims have been canceled.

35 U.S.C. §102

The examiner rejected claims 1-2, 21, 22, and 25 under 35 U.S.C. §102(b) as being anticipated by Banan. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP § 2131. Banan teaches a method for producing single crystal silicon using a crystal growth apparatus.

Regarding independent claims 1 and 2, Banan fails to teach a fluid conduit defining a substantially cylindrical heat regulation void. Banan fails to teach a heat regulation void defining an inside diameter selected to accommodate an object subject to heat regulation and a circumferential gas flow path between an object and a fluid conduit. Banan shows a vacuum chamber 1 having a crucible 3 and a portion of a crucible drive unit 7 contained therein (Col. 3, lines 28-33). The vacuum chamber 1 has resistance heater 5 located proximate the crucible 3 and insulation 25 located proximate to the resistance heater 5 (Col. 3, lines 28-41). A cooling water jacket 33 surrounds the vacuum chamber 1 and is fed with cooling water from a reservoir 35 (Col. 3, lines 44-46). The water is drained to a cooling water return manifold 37 (*Id.*).

The water jacket 33 of Banan is not a fluid conduit defining a substantially cylindrical heat regulation void defining an inside diameter selected to accommodate an object subject to heat regulation and a circumferential gas flow path between an object and a fluid conduit. Banan does not show or suggest that the void formed inside the water jacket 33 is substantially

cylindrical. Additionally, the water jacket 33 has insulation 25 and a resistance heater 5 between the water jacket and the crucible 3. Therefore, the water jacket 33 cannot define a heat regulation void defining an inside diameter selected to accommodate an object subject to heat regulation and a circumferential gas flow path between an object and a fluid conduit, because any gas flow path could not be between an object and the water jacket, and Banan does not suggest such a heat regulation void. Similarly, any gas flow path could not be between the drive shaft of the crucible drive unit 7 and the water jacket 33. Therefore, claims 1 and 2 are not anticipated by Banan. Claims 21 and 22 depend from claim 1, and claim 25 depends from claim 2. Therefore, claims 1, 2, 21, 22, and 25 are patentable over the cited and applied prior art.

The Examiner rejected claims 9-10 and 32 under 35. U.S.C. §102(b) as being anticipated by Kimura. Kimura teaches a system for coating photoresist including a process unit. Kimura does not teach or suggest a passage extending through a flange body from an upper surface to a lower surface of the flange. Additionally, Kimura does not teach or suggest a temperature sensor positioned in thermal communication with a flange body proximate to the passage.

Kimura teaches a mount flange 31b mounted over a chuck driving member 31 (Col. 5, lines 10-29). The temperature of the flange 31b is adjusted by heat exchange with a constant-temperature water flowing through a channel 34 in the flange 31b (Col. 5, lines 17-29). A constant temperature circulator 33 circulates the water, and the temperature of the water is controlled by a temperature controller 36 (*Id.*). The flange 31b prevents heat generated by the driving member 31 from being transmitted to rotary shaft 31a (*Id.*).

Regarding independent claims 9-10, Kimura does not show a passage extending through the flange from an upper surface to a lower surface. Such a passage is not shown in the drawings nor described in the specification of the patent. A passage is not necessary for the operation of the invention. For example, it is entirely possible that the flange 31b is located next to rotary shaft 31a. Additionally, Kimura does not show or teach a temperature sensor positioned in thermal communication with a flange body proximate to the passage. Kimura merely shows a temperature controller 36 schematically. Kimura does not state that the temperature controller 36 has a temperature sensor located on the flange 31b. Because the temperature controller

controls the temperature of a constant temperature water circulator, any temperature sensor could be located at the water circulator 33 rather than the flange 31b. Additionally, Because Kimura does not teach a passage through the flange, Kimura cannot teach a temperature sensor proximate to a passage. Amended claim 32 is dependent on claim 9. Therefore, claims 9-10 and 32 are patentable over the cited and applied prior art.

35 U.S.C. §103

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Banan. As discussed above, Banan does not teach or suggest a heat regulation void defining an inside diameter selected to accommodate an outside diameter of a spindle subject to heat regulation and a circumferential gas flow path between an object and a fluid conduit. Therefore, claim 3 is patentable over the cited and applied prior art.

The Examiner rejected claims 1-5, 11-12, 15-18, 21-22, 25-28, 30, and 33-35 under 35 U.S.C. §103(a) as being unpatentable over Sugimoto in view of Kimura. Sugimoto teaches a substrate spin coating apparatus that uses an air flow under the wafer to prevent material from being spin coated on the underside of the wafer.

Regarding independent claims 1-5 and 15-18, replacing the air conduit 30 of Sugimoto with a water jacket as the Examiner suggests would destroy the operability of the spin coating apparatus. The air conduit 30 of Sugimoto is used to supply an air flow F through an opening 20 under the substrate W (Col. 5, lines 26-58; Col. 7, lines 57-67). The air flow F moves through the opening 20 to become an adjusted air flows F1, and air flows F1 prevents mist and particles from flowing around the lower surface of the substrate wafer W (Col. 7, lines 57-67). If the air conduit 30 was replaced with a water jacket, the underside of the substrate W could be subject to undesirable contamination. Therefore, there is no motivation to modify Sugimoto as the Examiner suggests.

Additionally, although Kimura does not appear to teach a water jacket around a spindle, Banan teaches such a water jacket. However, as discussed above, Banan does not teach or suggest a heat regulation void defining an inside diameter selected to accommodate an outside diameter of

a spindle subject to heat regulation and a circumferential gas flow path between an object and a fluid conduit. Claims 21-22 depend from claim 1, and claims 25-26 depend from claim 2. Claims 27, 28, and 30 depend from claim 3, and claims 33-35 depend from claim 16. Therefore, claims 1-5, 15-18, 21-22, 25-26, 27-28, 30, and 33-35 are patentable over the cited and applied prior art.

Regarding independent claims 11-12 and 15-18, the combination of Sugimoto and Kimura does not teach or suggest a passage extending through a flange body from an upper surface to a lower surface of the flange or a temperature sensor positioned in thermal communication with a flange body proximate to the passage. As the Examiner notes, Sugimoto does not teach a flange attached to the drive motor. As discussed above, Kimura does not teach a passage extending through a flange body. Additionally, as discussed above, Kimura does not teach a temperature sensor positioned in thermal communication with a flange body proximate to the passage. Therefore, claims 11-12, 15-18, and 33-35 are patentable over the cited and applied prior art.

The Examiner rejected claims 23-24 under 35 U.S.C. §103(a) as being unpatentable over Sugimoto in view of Kimura as applied to claim 1 and further in view of Stone. Stone teaches a refrigeration apparatus having a coil of condenser tubing. Claims 23-24 depend from claim 1. As discussed above with respect to claim 1, there is no motivation to combine Sugimoto and Kimura as the Examiner suggests. Additionally, as discussed above, the references do not teach or suggest a heat regulation void defining an inside diameter selected to accommodate an object subject to heat regulation and a circumferential gas flow path between an object and a fluid conduit. Stone does not teach or suggest such a heat regulation void. Therefore, claims 23-24 are patentable over the cited and applied prior art.

The Examiner rejected claim 29 under 35 U.S.C. §103(a) as being unpatentable over Sugimoto in view of Kimura as applied to claim 3 and further in view of Takahashi. Takahashi teaches an evacuation system for shortening pumping time. Claim 29 depends from claim 3. As discussed above with respect to claim 3, there is no motivation to combine Sugimoto and Kimura as the Examiner suggests. Additionally, as discussed above, the references do not teach or suggest a heat regulation void defining an inside diameter selected to accommodate an outside diameter of

a spindle to heat regulation and a circumferential gas flow path between an spindle and a fluid conduit. Takahashi does not teach or suggest such a heat regulation void. Therefore, claim 29 is patentable over the cited and applied prior art.

The Examiner rejected claim 31 under 35 U.S.C. §103(a) as being unpatentable over Kimura in view of Hayes. However, the Examiner has not shown that there is a motivation to combine Kimura and Hayes. Amended claim 31 is dependent on claim 9. As discussed above with respect to claim 9, Kimura does not teach a passage extending through a flange body. Additionally, as discussed above, Kimura does not teach a temperature sensor positioned in thermal communication with a flange body proximate to the passage. However, Kimura does teach a flange secured to a drive motor.

Hayes teaches a heat exchanger coupled to a chuck near a wafer support surface (Col. 5, lines 24-40). However, Hayes does not teach a flange secured to a drive motor. Instead, the heat exchanger 340 of Hayes is located around the shaft 226 of a spin chuck as shown in Figs. 5-7. The heat exchanger 340 may rotate with the rotation of the shaft. Additionally, the heat exchanger may be moveable (Col. 5, lines 40-46). The Examiner has not provided and the references themselves do not provide a motivation to combine the temperature sensor of Hayes with the flange of Kimura. As discussed above, Kimura relates to a flange secured to a drive motor while Hayes teaches a movable heat exchanger. There is no reason to combine the temperature sensor from a moveable heat exchanger with a flange that does not teach a temperature sensor in thermal communication therewith. Claim 32 is patentable over the cited and applied prior art.

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CONCLUSION

Applicants respectfully submit that, in view of the above amendments and remarks, the application is now in condition for allowance. Early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,

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Appendix A

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

Claims 6-8, 13-14, and 19-20 have been cancelled.

Claims 31 and 32 have been amended.

6-8. (Canceled)

13-14. (Canceled)

19-20. (Cancelled)

31. (Amended) A heat regulating flange as claimed in claim ~~8~~ 9 wherein said temperature sensor is embedded in said flange body.

32. (Amended) A heat regulating flange as claimed in claim ~~8~~ 9 wherein said fluid duct is arranged about said passage.